Remarks/Arguments:

Claims 1-8, 10, 15, 16, 18, and 21-27 were the pending claims in this application. Claims 6 and 10 have been amended to correct minor typographical errors. These claims are supported throughout the original specification. No new matter has been added. Accordingly, claims 1-8, 10, 15, 16, 18, and 21-27 remain the pending claims in this application.

Rejections under 35 U.S.C. § 103

Claims 1-8, 10, 15, 16, 22, 23, and 25 stand rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent No. 4,550,034 to Shimrock et al. (hereinafter "Shimrock") with evidence from U.S. Patent No. 6,840,976 to Vance et al. (hereinafter "Vance"). Claim 24 stands rejected as obvious over Shimrock with evidence from Vance and in view of U.S. Publication No. 2007/0028604 (Twigg et al.). Claims 18, 21, 26, and 27 stand rejected as obvious over Shimrock with evidence from Vance and U.S. Patent No. 6,695,278 to Ellis (hereinafter "Ellis"). Applicant respectfully traverses these rejections. Applicant contends that these rejections are improper, and the claims distinguish over the cited references because Shimrock, by itself or with evidence from Vance or any other disclosed reference, fails to disclose or suggest (1) a wall-flow filter; and (2) reducing the pressure in the pore structure of the wall-flow filter *prior to* contacting the surface of the evacuated channel walls with the liquid.

"To establish a *prima facie* case of obviousness, ... the prior art reference (or references when combined) must teach or suggest all the claim limitations." M.P.E.P. §2143. A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984). See M.P.E.P. § 2141.02(VI).

Wall-flow filter vs. Flow-through monolith

Claim 1 is directed to a method of manufacturing a catalysed ceramic wall-flow filter. Claim 1 expressly recites that "reducing pressure in the pore structure of the wall-flow filter occurs prior to contacting the surface of the evacuated channel walls with the liquid and the plurality of channels in the wall-flow filter are plugged at an inlet end or an outlet end of the wall-flow filter." Thus, as claimed, the method is used for making a wall-flow filter. As known to one having ordinary skill in the art and as discussed in the prior response, a wall-flow filter is substantially different from a flow-through monolith. A technical declaration under 37 C.F.R.

§1.132, with supporting documents, was submitted on July 6, 2010 to further explain this distinction to the Examiner. In summary, a wall-flow filter has a plurality of channels, the channels having porous channel walls. Each of the channels is plugged at an inlet end or at an outlet end. This arrangement causes the gas to pass through the porous channel walls to reach the downstream end of the filter. See the disclosure at page 2, lines 11-18 of the original specification.

On the other hand, the channels of flow-through monoliths do not have plugged ends, and the gas passes straight through each of the channels instead of across porous channel walls. Shimrock describes only a flow-through monolith, not a wall-flow filter. The interior of the ceramic monolith is a plurality of longitudinal passages extending from end to end thereof. See column 4, lines 15-17 of Shimrock. The flow path is along the length of the channels, i.e., axially. Shimrock does not disclose that the plurality of channels in the monolith are plugged at an inlet end or an outlet end, as recited by claim 1. Thus, Shimrock fails to disclose or suggest a wall-flow filter. The Office Action concedes that Shimrock does not expressly teach the monolith filter being a wall-flow filter. However, the Office Action attempts to overcome this deficiency by citing to Vance as teaching a method of manufacturing a "wall-flow monolith filter," and suggesting that, because that title combines the terms "wall-flow filter" with "monolith filter," wall-flow filters must be one type of monolith filter and that the teachings of the present invention are thus met by Shimrock.

First, one of ordinary skill in the art would appreciate that while the terms "wall-flow" and "flow-through" are distinguished in the industry and relate to different apparatuses, the terms "monolith," "filter," and "honeycomb" are used to describe a broader group of technologies which may include both types of apparatuses. Flow-through monoliths have been utilized in the industry for decades and, as the development of wall-flow filters led to their introduction in the marketplace, the nomenclature of the flow-through monoliths was applied to the wall-flow filters. The term "honeycomb" is commonly used to refer to their shared cellular structure, the term "monolith" is commonly used to refer to their shared characteristic as manufactured single-body units, and the term "filter" is commonly used to refer to their shared functionality - namely filtration. The similar nomenclature does not dictate that flow-through monoliths and the wall-flow filters are one-in-the-same, that the latter is just a subset of the former, or that they have the same functional performance parameters. This is well known to one having ordinary skill in the art, as supported by the previously submitted technical declaration of Paul Andersen and its accompanying documents. Vance does relate to a wall-

flow filter and states that a "ceramic honeycomb wall-flow filter 'comprises' a *monolithic* ceramic *honeycomb* body" and is the apparatus produced by their method. (See Vance, Col. 2, Lines 23-54; Emphasis added). The apparatus produced by the method of the Shimrock, however, is clearly a flow-through monolith as it describes only that the plurality of longitudinal passages extend from one end of the ceramic monolithic member to the other end (i.e., no gas is passed through the channel walls of the flow-through filter). (See Shimrock, Col. 4, Lines 13-17).

Secondly, as the technical declaration and its accompanying documents state, wall-flow filters and flow-through monoliths are structurally different and perform in very different ways. The steps used to manufacture and catalyze the wall-flow filters and flow-through monoliths are, therefore, different. An important difference in the functionality of the wall-flow filters, vis-à-vis, the flow-through monoliths, for example, is enabled by the fact that the former has porous channel walls which are loaded with catalyst and have filtering properties. Flow-through filters, however, do not have porous channels walls through which the gas is passed and filtered.

Reduction of pressure

As is appreciated by one having ordinary skill in the art and taught by the present invention, loading catalyst in the porous channel walls of the wall-flow filter requires a different procedure than applying catalyst to the walls of a flow-through monolith. For example, claim 1 of the present invention recites, in part, that the step of reducing the pressure in "the pore structure of the wall-flow filter occurs **prior to** contacting the surface of the evacuated channel walls with the liquid." Thus, as claimed, there is a step of reducing the pressure to provide evacuated channel walls and another step, occurring after the reducing step, of contacting the surface of the evacuated channel walls with the catalyst component/precursor. It is important that the structure be evacuated prior to contact with the liquid as this enables the catalyst to permeate the channels more readily, impregnate the pores more deeply, and coat the structure more uniformly. The advantages of reducing the pressure prior to contacting the surface of the evacuated channel walls with the liquid are discussed in the application as filed at, for example, page 1, paragraph [0014]; page 3, paragraph [0038]; and in the Example at page 4, paragraphs [0045-0049].

The Office Action states that the limitations of the present invention, specifically the recitation that "the pore structure of the wall-flow filter occurs prior to contacting the surface of

the evacuated channel walls with the liquid" is met by the teachings of Shimrock. The Office Action concedes that Shimrock does not expressly teach reducing the pressure in the pore structure of the wall-flow filter prior to contacting the surface of the evacuated channel walls with the liquid. This limitation, however, is believed by the Office Action to be met by the teachings of claim 1. The Office Action states that:

> Shimrock does not expressly teach [that] reducing the pressure in the pore structure of the wall-flow filter occurs prior to contacting the surface of the evacuated channel walls with the liquid. However, claim 1 teaches the use of a vacuum, which can be applied either before or after contacting the surface of the evacuated channel walls with the liquid. So, it would have been obvious to a person of ordinary skill in the art at the time of the invention to draw a vacuum prior to contacting the surface of the evacuated channel walls with the liquid in the invention of Shimrock.

(Office Action, page 5). Applicant respectfully disagrees, however, because Shimrock does not contemplate applying the vacuum first, and expressly teaches the opposite, namely contacting the substrate with the slurry, and subsequently, applying a vacuum.

In determining the differences between the prior art and the claims, the question under 35 U.S.C. 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530 (Fed. Cir. 1983). A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984). See also M.P.E.P § 2141.02.

Shimrock discloses first placing the ceramic monolithic catalyst support member in a reservoir containing a predetermined amount of slurry, and subsequently, applying a vacuum to the opposite end of the monolith to draw the slurry into the interior skeletal passageways until the slurry in the reservoir is exhausted. (Shimrock Col. 3, Lines 10-24). Shimrock cautions that it is *critical* that, when the monolith is partially submerged in the coating slurry to maintain a gap between the bottom edge of the monolith 18a and the bottom surface 16 of the pan 10 exists *before* the vacuum is drawn. (Shimrock, Col. 7, Lines 3-10). See also Figure 1 showing the monolith 18 placed in a pan 10 of slurry 11 submerged below slurry level 11a, and then applying a cover 14 to apply a reduced pressure in chamber 21. Most notably, Shimrock states:

"By the practice of the present invention, only the interior skeletal passageways of the monolithic member are coated. No draining or purging of excess coating slurry from the monolithic member is necessary or required *nor is any pre-vacuum application step, such as pre-evacuation of air from the ceramic member, required.*" (Shimrock, Col. 3, Lines 28-39). Therefore, Shimrock, considered in its entirety, fails to disclose or suggest reducing the pressure in the pore structure *prior to* contacting the surface of the evacuated channel walls with the liquid, and actually teaches away from the claimed invention by indicating that it is critical to position the monolith in a certain way when submerged in the coating slurry before applying any vacuum.

Even if the process of Shimrock was modified to employ a vacuum prior to contacting the surface of the evacuated channel walls with the liquid, as suggested by the Office Action, it would not achieve the performance or function of the present invention. The vacuum of Shimrock is used to *draw-up* the coating slurry from the pan into the surface pores of the ceramic monolith. (See Shimrock, Col. 4, Lines 35-39, Emphasis Added). That is to say, Shimrock requires an active vacuum to "pull" the coating slurry into the channels and surface pores of the flow-through monolith. The process of the present invention teaches that the channels and pores of the wall-flow filter are evacuated prior to contact between the filter surface and the coating liquid. The entire structure is evacuated prior to contact with the coating liquid. Because the entire structure of the present invention is evacuated, there is no need to "draw-up" the coating liquid, as performed by Shimrock. The coating liquid readily permeates the evacuated channels of the apparatus produced by the present invention. (See Specification, page 1, paragraph [0014] and page 4, paragraph [0044]). This distinction is important for wall-flow filters, as the coating liquid is needed to permeate the porous channels walls and impregnate them with catalyst. Drawing-up the coating liquid by an active vacuum, as taught by Shimrock, may work for a flow-through monolith in which only the channels are coated, but would not be successfully employed to perform the more difficult task of impregnating and permeating the porous channel walls of a wall-flow filter.

Accordingly, Applicant respectfully submits that a *prima facie* case of obviousness has not been established. Thus, claim 1 should be in condition for allowance. Claims 2-8, 10, 15, 16, and 22-25 depend from claim 1, and therefore should each be allowed as dependent thereon.

Maintaining a pressure differential

The contrast between the process of Shimrock for flow-through monoliths and the process of the present invention for wall-flow filters is made even more clear by the recitation in the specification as filed, and by the limitation of claim 3, which relates to maintaining the pressure reduction in the pore structure of the channel walls during the liquid contacting step. One having ordinary skill in the art would readily appreciate that, once the pressure in a pore structure of the channel walls is reduced relative to the surrounding atmospheric pressure to provide evacuated channel walls, a pressure differential has been created. As disclosed in the specification at, for example, page 2, paragraph [0016]; page 3, paragraph [0036]; and recited in claim 3, this pressure differential is maintained during the liquid contacting step to enable the coating liquid to permeate and impregnate the porous channel walls and to prevent stresses to the substrate which may lead to failure of the part. Shimrock does not teach or disclose this pressure differential, or the process for manufacturing a catalysed ceramic wall-flow filter, as recited by claim 3 of the present invention. Shimrock instead teaches that a reduced pressure is applied in the chamber which causes the coating slurry to be drawn upwardly into the submerged portion of the monolith under the influence of the vacuum created in the chamber. (Shimrock, Col. 5, Lines 10-25). Quite simply, because Shimrock does not apply the vacuum prior to contacting the channel walls with the liquid, Shimrock certainly can not be said to be "maintaining the pressure reduction."

The process of Shimrock could not be employed to successfully achieve the catalyst loading of the present invention for wall-flow filters. The process of Shimrock relies on an active vacuum to draw-up the coating liquid into the structure. When employed in a process for manufacturing a catalysed wall-flow filter, such an active vacuum would result in a catalyst loading gradient, i.e., a range of catalyst loading across the length of the substrate. The process of Shimrock works suitable for flow-through monoliths as the coating liquid and catalyst is drawn-up axially through the monolith and only used to coat the channel walls. The process of Shimrock, if employed for a wall-flow filter, would likely result in unequal permeation and impregnation of the porous channel walls by the catalyst and produce an undesirable catalyst gradient across the length of the wall-flow filter. The use of an active vacuum process to catalyze a wall-flow filter, and the undesirable result produced there from, is discussed in the application as filed at page 1, paragraphs [0009-0010].

One having ordinary skill in the art would readily appreciate that the wall-flow filter discussed in the present invention and the flow-through monolith of Shimrock are substantially different and have substantially different process requirements to be suitably catalysed. Shimrock, by itself or in combination with any other cited reference, fails to teach or suggest all the claim limitations of the present invention. Accordingly, the teachings of the present invention would not have been obvious to one having ordinary skill in the art from the teachings of Shimrock, by itself or in combination with any other cited reference.

Accordingly, for this reason as well, Applicant respectfully submits that a *prima facie* case of obviousness has not been established. Thus, claim 1 should be in condition for allowance. Claims 2-8, 10, 15, 16, and 22-25 depend from claim 1, and therefore should each be allowed as dependent thereon.

Remaining Claim Rejections under 35 U.S.C. § 103(a), in view of further references.

Claim 18, while not identical to claim 1, recites similar features. Claim 18 relates to an apparatus for use in manufacturing a catalysed ceramic wall-flow filter having filter walls, wherein said filter walls define a plurality of channels and have a pore structure, the plurality of channels in the wall-flow filter are plugged at an inlet end or an outlet end of the wall-flow filter. The apparatus includes a means for reducing pressure in the isolated channels to below the surrounding atmospheric pressure thereby to establish a vacuum in the pore structure of the filter walls to provide isolated and evacuated channels. As Shimrock fails to teach or suggest the features of claim 18, a prima facie case of obviousness has not been established. Claim 21 depends from claim 18, and therefore should be allowed as dependent thereon.

Similarly, claim 26, while not identical to claim 1, recites similar features, including a plurality of channels in the wall-flow filter are plugged at an inlet end or an outlet end of the wall-flow filter, and a vacuum pump to reduce pressure in the isolated channels to below the surrounding atmospheric pressure thereby to establish a vacuum in the pore structure of the filter walls to provide isolated and evacuated channels. As Shimrock fails to teach or suggest the features of claim 26, a *prima facie* case of obviousness has not been established. Claim 27 depends from claim 26, and therefore should be allowed as dependent thereon.

As Twigg and Ellis are not relied upon in the Office Action for the features of wall-flow filters or reducing pressure prior to contacting the evacuated channel walls, a *prima facie* case

of obviousness has also not been shown with respect to combinations of Shimrock with these additional references for at least the reasons set forth above.

Additionally, with respect to claim 24, Twigg et al. (U.S. Publication No. 2007/0028604) does not qualify as prior art under 35 U.S.C. 102(e). In order to qualify as prior art under Section 102(e), the reference must be a published application, a granted patent, or an international application filed under the Patent Cooperation Treaty (which designates the U.S. and is filed in English) filed by another in the United States *before* the invention by the applicant. 35. U.S.C. § 102(e). Twigg et al. does not qualify as prior art because the PCT (PCT/GB04/00882) for Twigg et al. was filed March 5, 2004, which is the same date as the filing date of the priority application in the present case, not before. Nonetheless, Twigg et al. is owned by Johnson Matthey, which is also the assignee of the present case, so Twigg et al. cannot be used in an obviousness rejection under 35 U.S.C. § 103(c)(1). Accordingly, Applicant respectfully requests that the rejection over claim 24 be withdrawn.

Conclusion

For all of the foregoing reasons, Applicant respectfully requests reconsideration and allowance of the claims. Applicant invites the Examiner to contact his undersigned representative if it appears that this may expedite examination.

Respectfully submitted,

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